



PhraseApp

Continuous Delivery with Kubernetes

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Container Scheduler?

Well, yes, but...

... there is a little bit more

Framework to build **Distributed Applications**

REST API

CNCF: independent from commercial vendors

Linux Kernel for the Cloud?

Getting Started

- [Google Container Engine \(GKE\)](#)
- [minikube](#)
- [kubeadm](#) (alpha in v1.4)
- ...
- [Kubernetes the Hard Way](#)

Pods

Pods

Set of tightly coupled containers running on a **single node**

Pod: Features

- dedicated ip
- shared network interface
- shared file system

Pod: Manifest

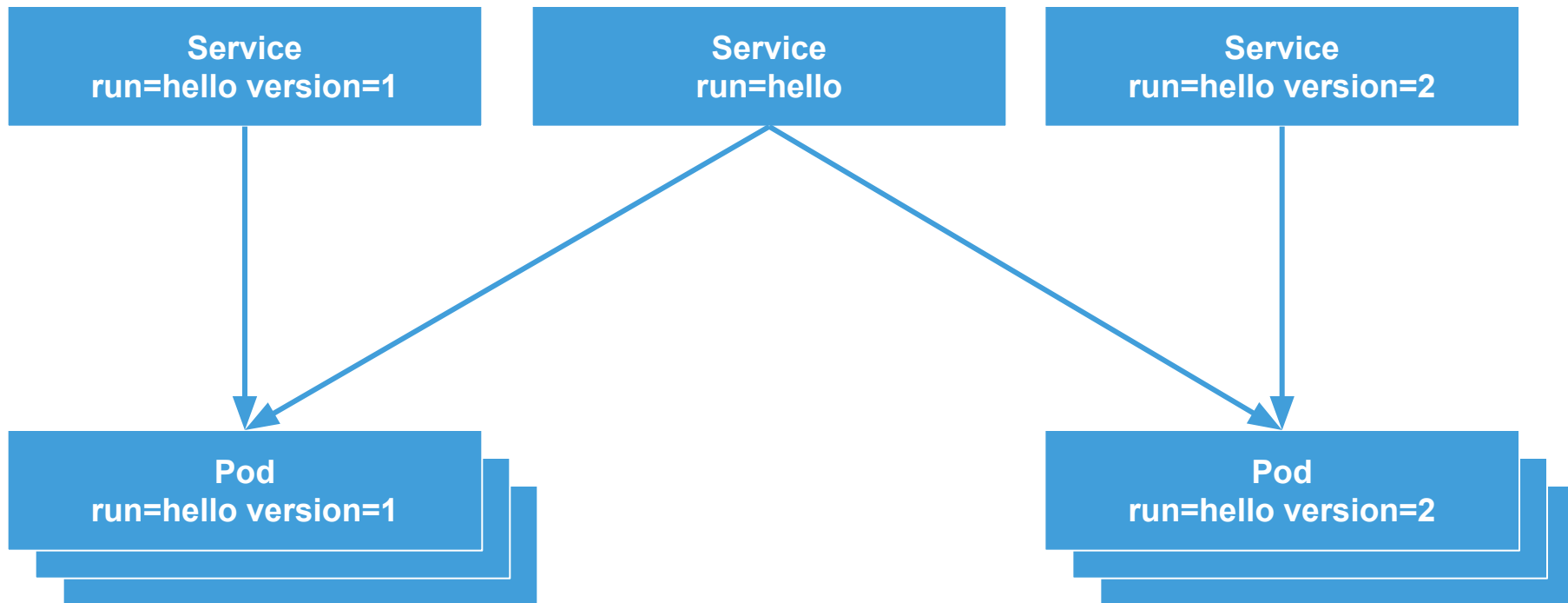
```
kind: Pod
apiVersion: v1
metadata:
  name: hello
  labels:
    run: hello
spec:
  containers:
  - name: hello
    image: quay.io/tobstarr/hello:v1
```

Services

Services

Policy to access a **logical set** of pods

Services



Service: Manifest

```
apiVersion: v1
kind: Service
metadata:
  labels:
    run: hello
  name: hello
spec:
  ports:
    - port: 80
      targetPort: 8080
      protocol: TCP
  selector:
    run: hello
```

Replica Sets

Fixed number of pod **replicas** running on **multiple nodes**

Deployments

declarative Pods updates

- image
- ENV
- configuration files
- labels

Configuration

ConfigMap: **plain text** configuration

- e.g. redis.conf, nginx.conf

Secret: **sensitive** information

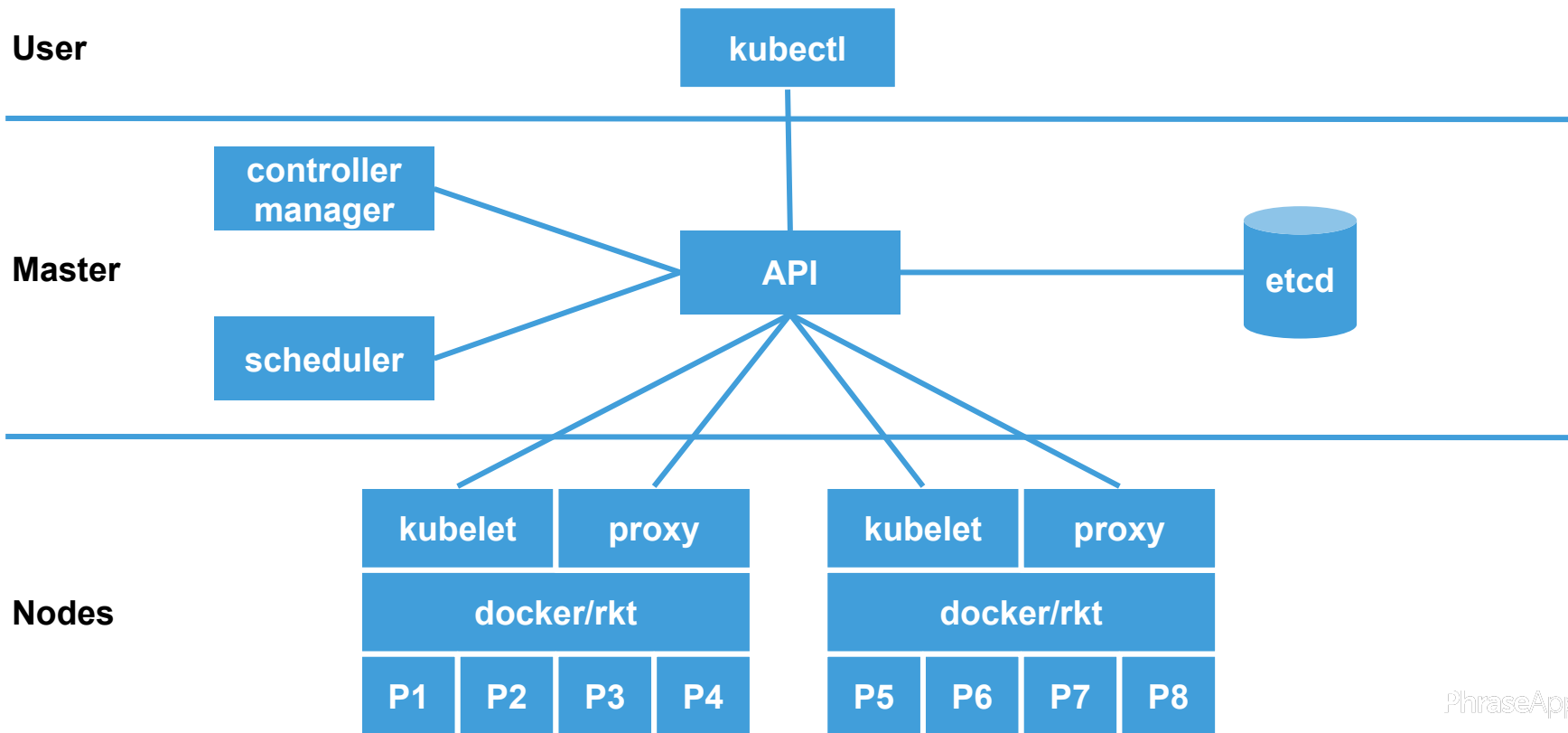
- e.g. TLS certs, registry credentials, etc.

Volumes

Persistent storage beyond container lifetime

- configMap
- secrets
- hostPath
- gcePersistentDisk
- awsElasticBlockStore
- nfs

Architecture



Demo

Continuous Delivery

Continuous Delivery

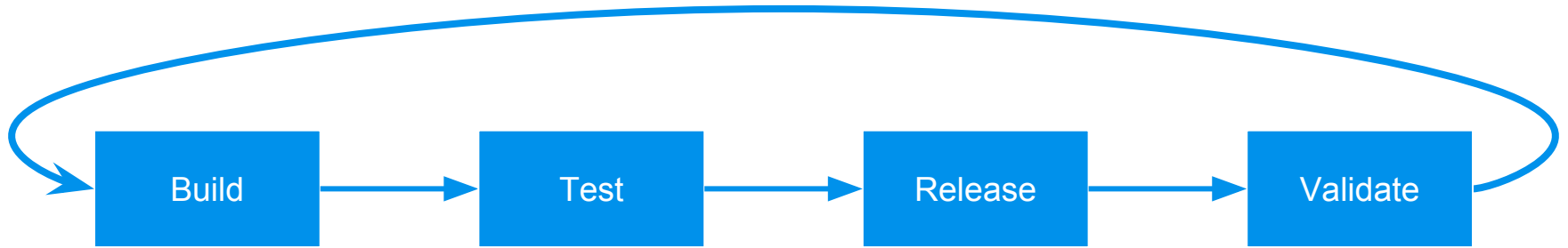
build, test, and release software **faster** and **more frequently**

Continuous Delivery

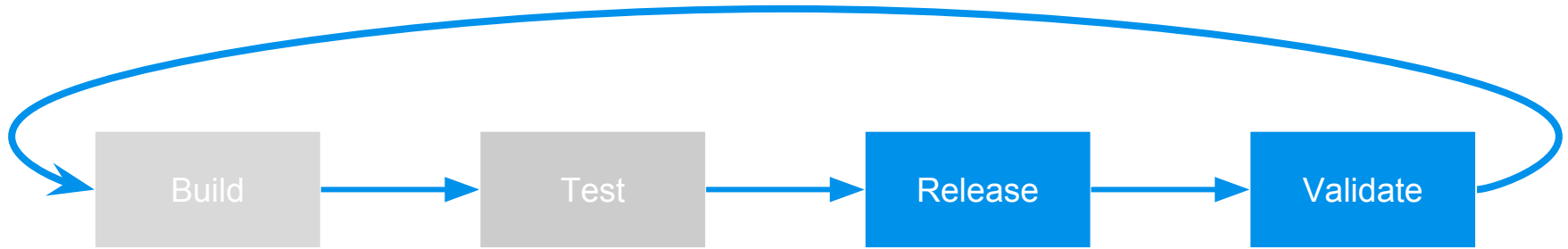
Our Philosophy:

- everyone **can** deploy any time
- you build it, you run it!
- **automation!**

Continuous Delivery Pipeline



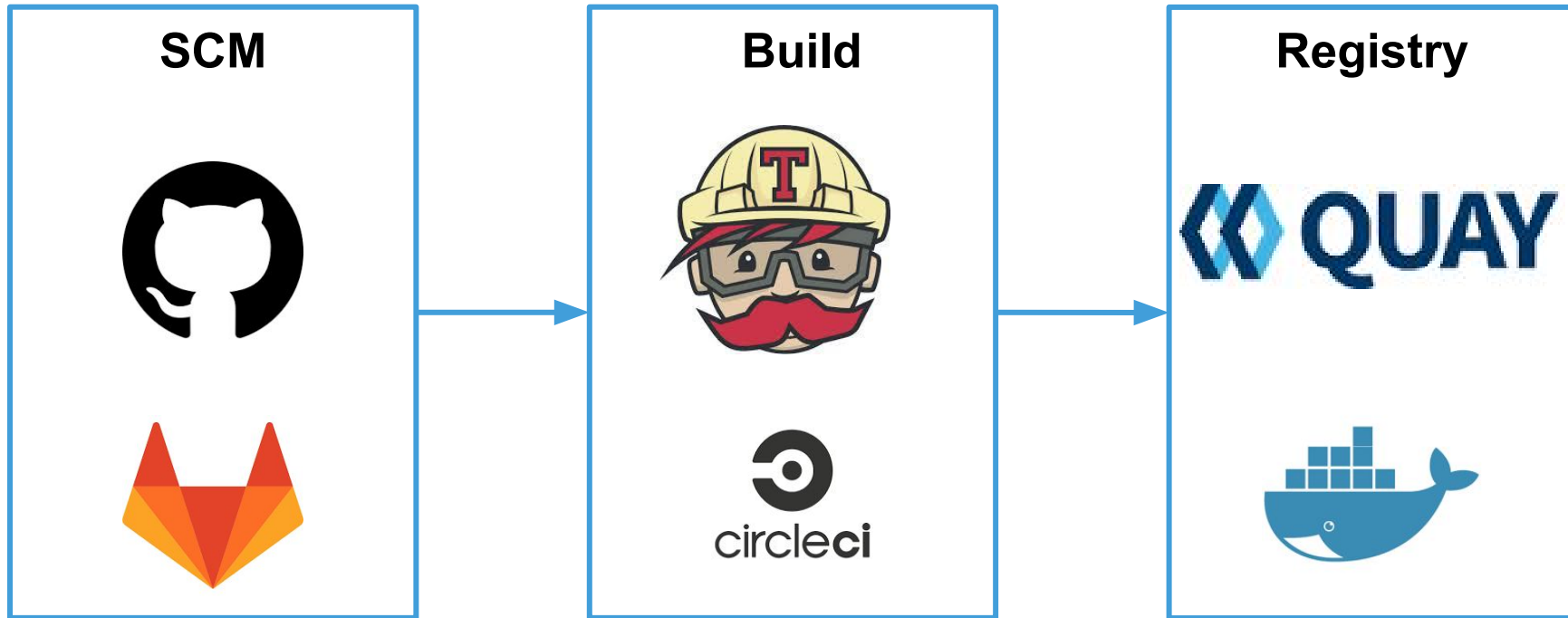
Build & Test



Build & Test

- compile
- run unit and functional tests
- build container image
- push container image to registry

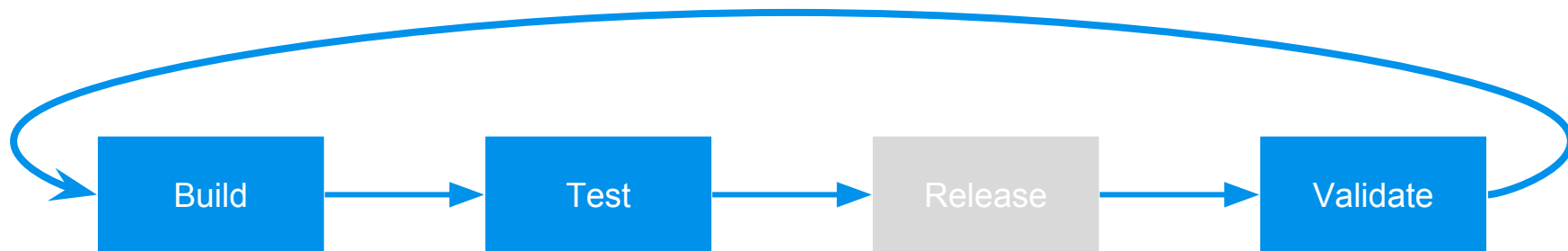
Build & Test - v1



Build & Test: Kubernetes

- jenkins container
- private registry container
- Pipeline plugin
- docker and kubectl in jenkins image
- `/var/run/docker.sock` via *VolumeMount*
- scale out builds via kubectl


Release



Release

```
kubectl set image ...
```

Kubernetes Build Pipeline


 **Jenkins**

[Jenkins](#) > [hello](#) > [master](#) > [ENABLE AUTO REFRESH](#)

[Up](#)
[Status](#)
[Changes](#)
[Build Now](#)
[View Configuration](#)
[Full Stage View](#)
[Pipeline Syntax](#)

Pipeline master

Full project name: hello/master

 [Recent Changes](#)

Stage View

Average stage times:

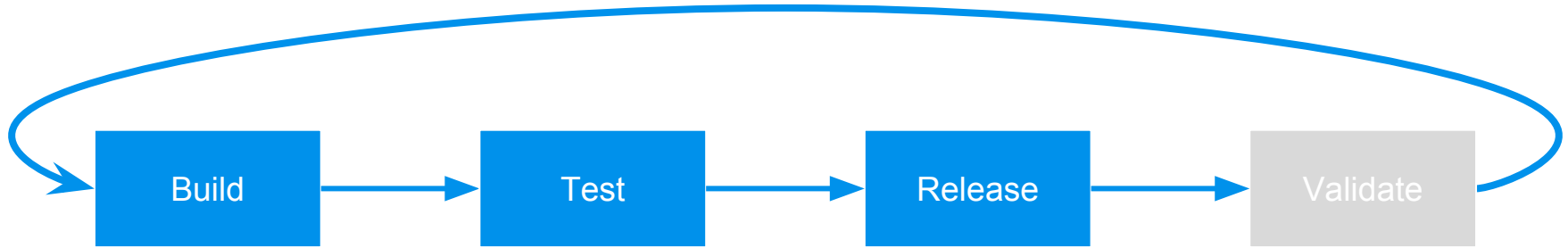
	SCM	Build	Test	Push	Release
#28 Sep 29 15:45 1 commits	915ms	3s	2s	271ms	6s
#27 Sep 29 15:43 2 commits	748ms	4s	2s	549ms	56s aborted
#26 Sep 29 15:27 1 commits	773ms	5s	2s	291ms	281ms
#25 Sep 29 15:25 1 commits	854ms	4s	2s	284ms	280ms

Build History

[trend](#)

- #28 Sep 29, 2016 1:45 PM
- #27 Sep 29, 2016 1:43 PM
- #26 Sep 29, 2016 1:27 PM
- #25 Sep 29, 2016 1:25 PM
- #24 Sep 29, 2016 1:23 PM
- #23 Sep 29, 2016 1:21 PM
- #22 Sep 29, 2016 1:20 PM
- #21 Sep 29, 2016 12:54 PM
- #20 Sep 29, 2016 12:53 PM

Validate



Monitoring

Cadvisor

- expose container metrics
- running on k8s nodes by default

Prometheus

- pull based monitoring & alerting
- <https://coreos.com/blog/prometheus-and-kubernetes-up-and-running.html>

Prometheus

Prometheus Alerts Graph Status ▾ Help

topk(10, container_memory_rss)

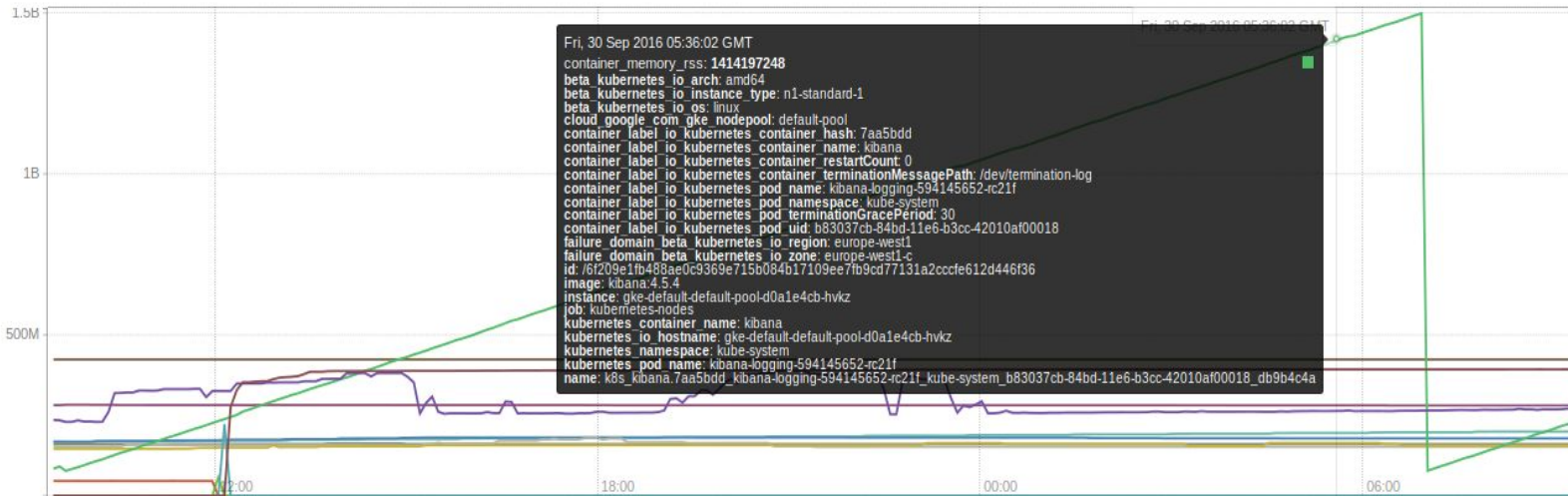
Load time: 230ms
Resolution: 345s

Execute

- Insert metric at cursor - ▾

Graph Console

- 1d + ◀ 2016-09-30 09:22 ▶ Res. (s) ☐ stacked



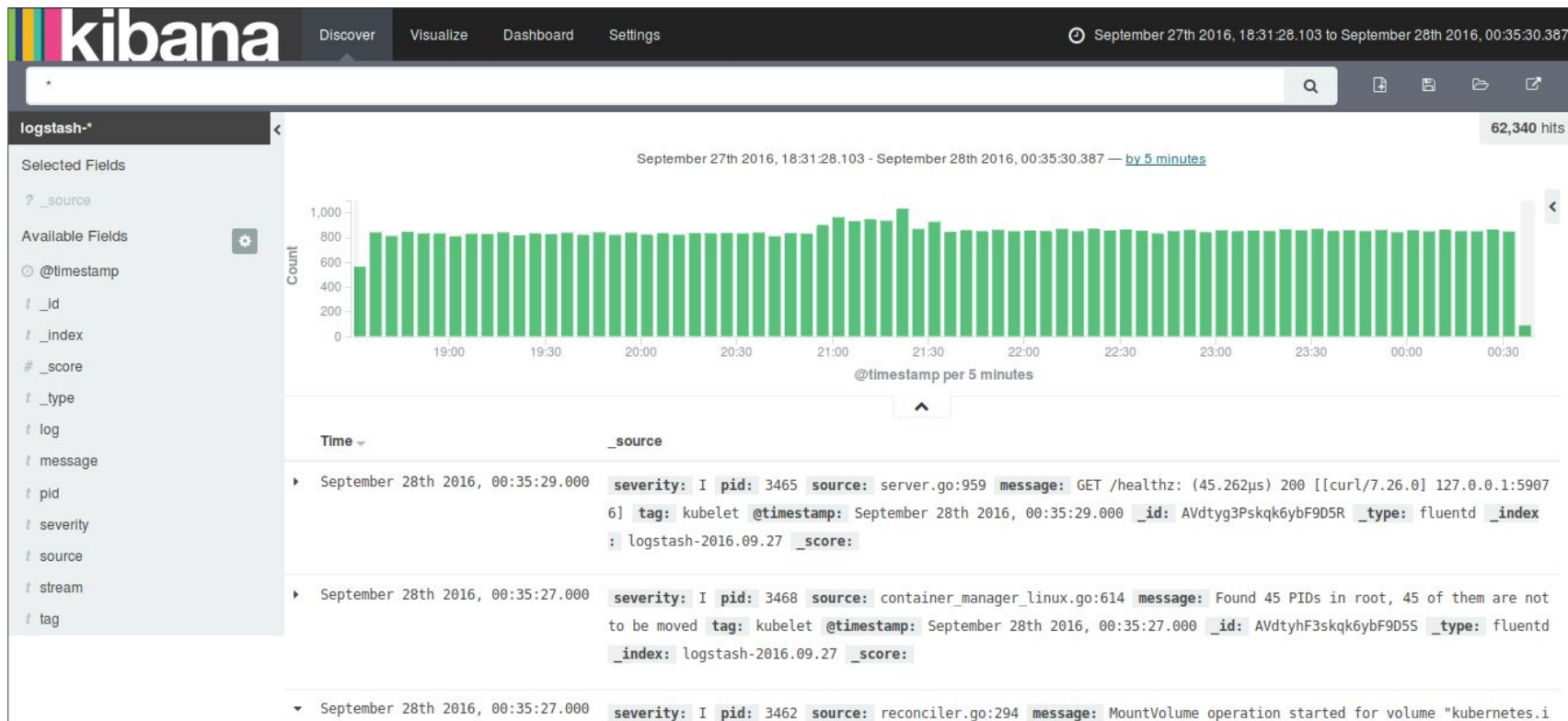
Logging

- apps log to **stdout**
- containers log to local file system
- [fluentd](#)
- [elasticsearch](#)
- [kibana](#)

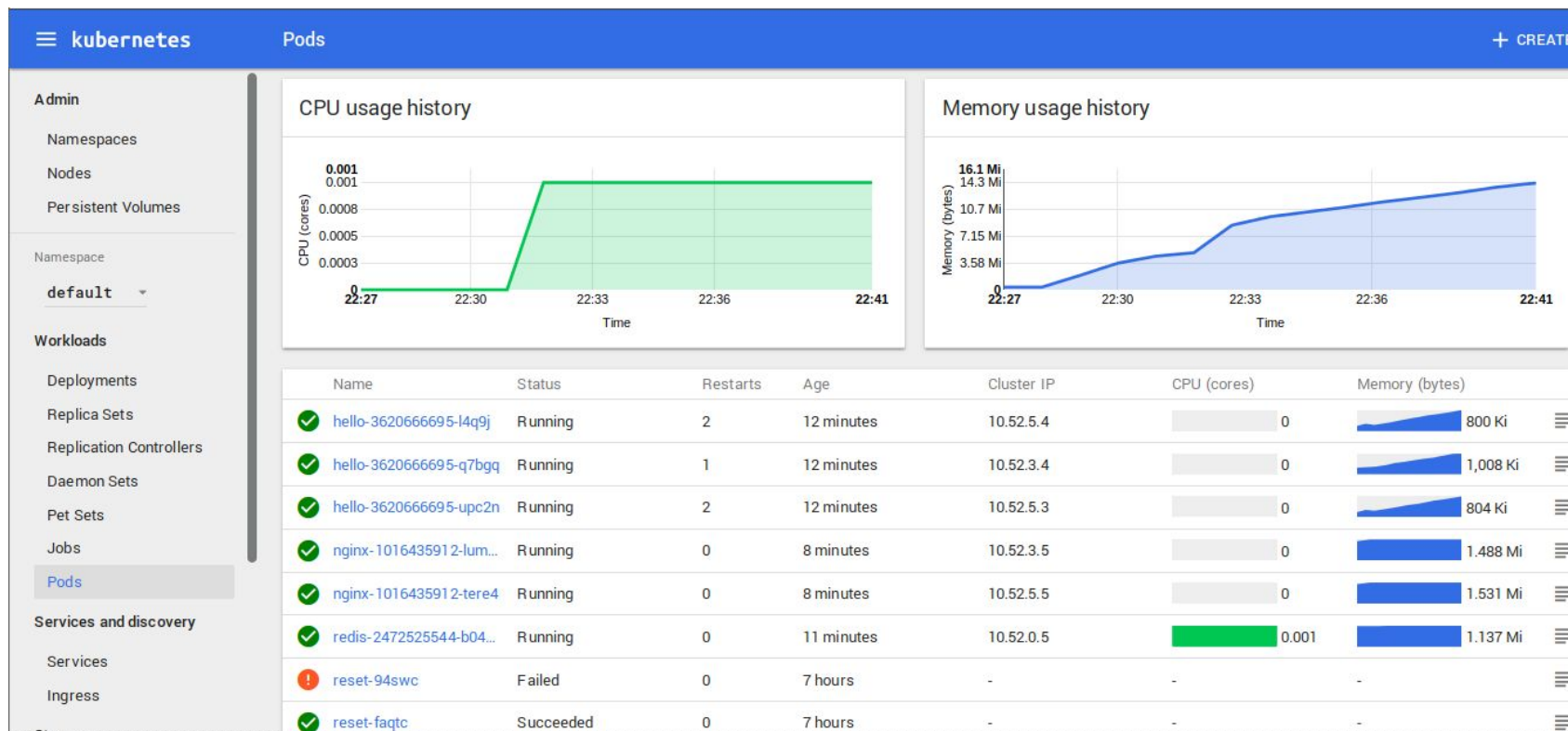
Logging

- *DaemonSet*: Pod running on selected **nodes** in a cluster
- mount node FS via *VolumeMount*
- fluentd sends logs to ElasticSearch
- display/search with Kibana

Kibana



Dashboard



Takeaways

- fully automated CD pipeline
- no **lock-in** or dependency to external services
- failure tolerance towards process **and** node failures
- **scalable!**

Source

- github.com/tobstarr/code-talks-2016
- github.com/tobstarr/hello



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